HT-2CWriter User′s Guide

September 2005

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Introduction

The Holtek HT-2CWriter was specifically developed to program the range of Holtek 2-Chip-1-Package (2 chips in one package) microcontroller devices allowing users to easily and efficiently burn their program code and data into 2-Chip-1-Package devices. The HT-2CWriter offers the advantages of a small and easy to manage size, in addition to easy to use special features. Other additional advantages include the ability to operate both connected to a PC in an on-line programming mode as well as being able to operate in a stand-alone programming mode. After downloading the program code and data from PC to HT-2CWriter, the stand-alone mode allows the user to program 2-Chip-1-Package devices without connection to a PC.

In the on-line programming mode, the HT-2CWriter is connected to the PC via the supplied RS232 cable. In the stand-alone programming mode, no connection is required to the PC. As the Holtek range of 2-Chip-1-Package devices are supplied in many different package types, a range of adapters is supplied by Holtek to match the appropriate package type and pin count being used. The correct adapter must therefore also be selected and plugged into the HT-2CWriter.

The HT-2CWriter writes both program code and data to 2-Chip-1-Package MCU device. The data can be initialized under HT-IDE3000 or HT-MWriter software utility.

The requirements for using the HT-2CWriter are:

- 16V power adapter with minimum current rating of 500mA. For best purpose use the power adapter supplied.
- The correct adapter to match the 2-Chip-1-Package device package type and pin count
- IBM 386 compatible or higher specification PC
- Win95/98/NT/2000/XP Windows operating system
- HT-MWriter software utility

Installation

For connection to the PC, use the supplied cable to connect the HT-2CWriter's 9-pin D-type connector to the RS232 port of the PC as shown in Figure 1.

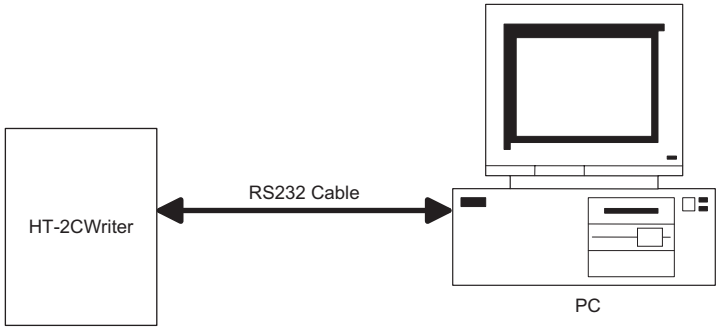


Figure 1

To install the writer software utility, run the HT-MWriterSetup.exe file as supplied with the HT2CWriter, after which the following instructions should be followed. Note, if the HT-MWriter software utility has been installed already, then ignore this software installation.

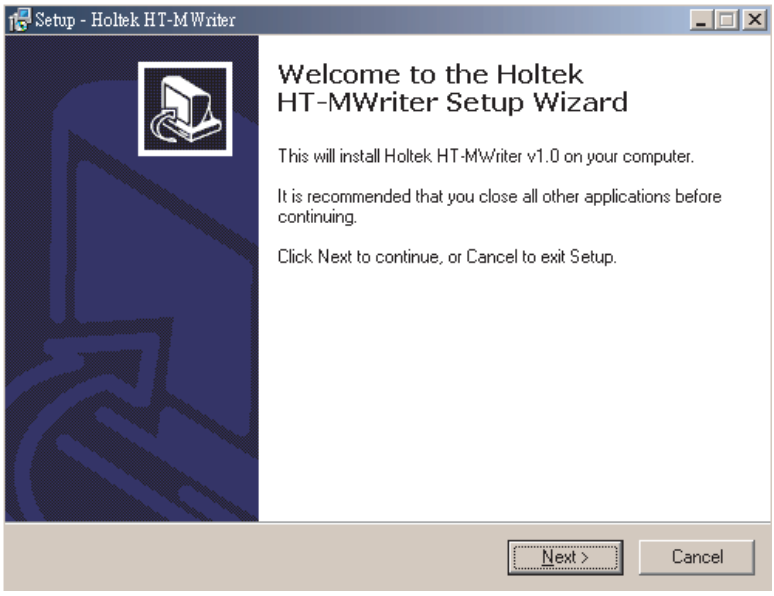

Setup - Holtek HT-MWriter
Welcome to the Holtek HT-MWriter Setup Wizard
This will install Holtek HT-MWriter v1.0 on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

Figure 2

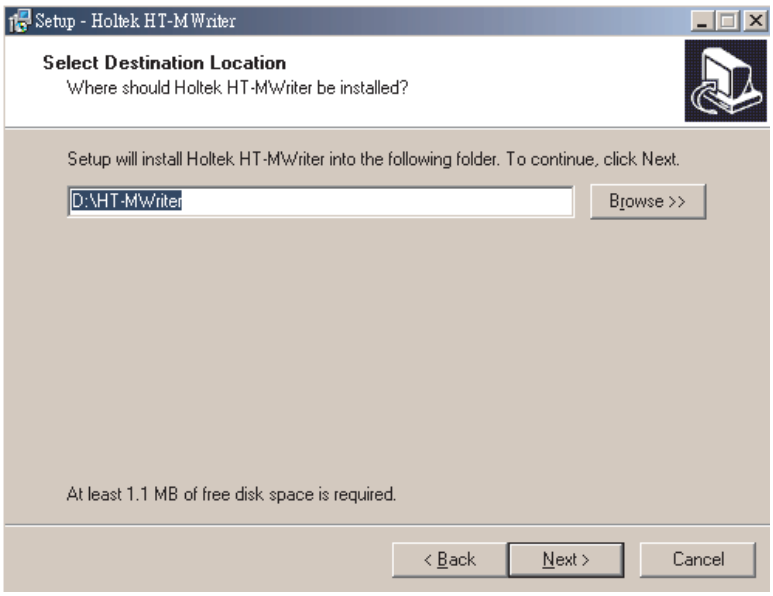

Setup - Holtek HT-MWriter
Select Destination Location
Where should Holtek HT-MWriter be installed?
Setup will install Holtek HT-MWriter into the following folder. To continue, click Next.
D:\HT-MWriter
Browse >>
At least 1.1 MB of free disk space is required.
< Back
Next >
Cancel

Figure 3

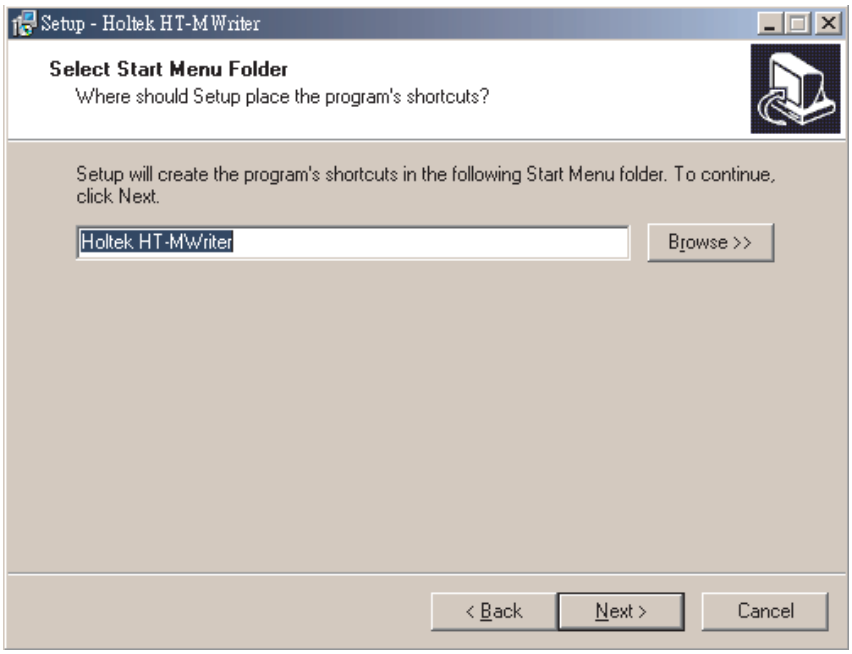

Setup - Holtek HT-MWriter
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder. To continue, click Next.
Holtek HT-MWriter
Browse >>
< Back
Next >
Cancel

Figure 4

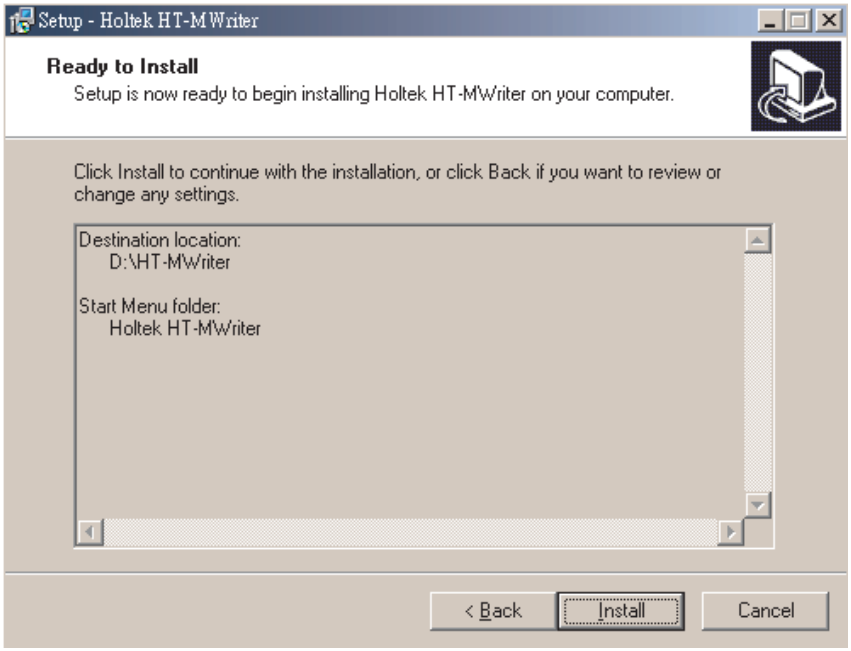

Setup - Holtek HT-MWriter
Ready to Install
Setup is now ready to begin installing Holtek HT-MWriter on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
D:\HT-MWriter
Start Menu folder:
Holtek HT-MWriter
< Back
Install
Cancel

Figure 5

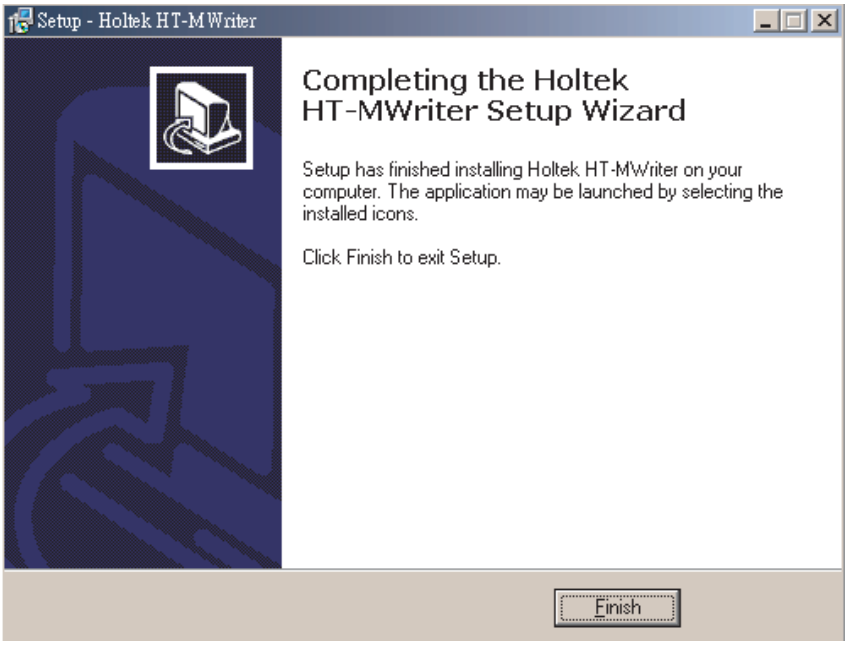

Setup - Holtek HT-M Writer
Completing the Holtek HT-MWriter Setup Wizard
Setup has finished installing Holtek HT-MWriter on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Finish

Figure 6

Accompanying Hardware

The outline of the HT-2CWriter is shown in Figure 7:

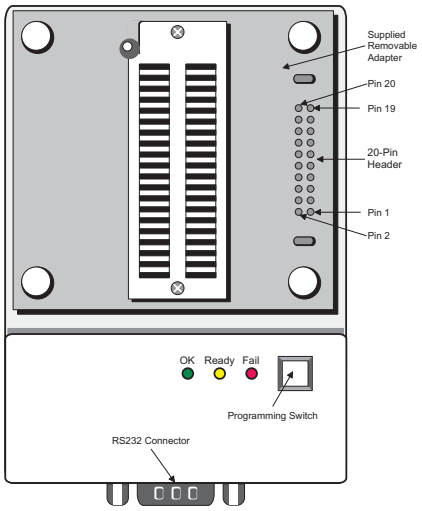


Figure 7

Component	Description
DC16V	DC JACK, DC 16V socket
20-Pin Header	Programming signal connector
OK	Green LED to indicate normal conditions
Ready	Yellow LED to indicate ready conditions
Fail	Red LED to indicate error conditions
Programming Switch	Programming key for stand-alone mode
RS232 Connector	9-pin D-type connector for PC RS232 port connection
4P DIP Switch	DIP switch on rear side of the HT-2CWriter

2-Chip-1-Package device Pin Name	Programming Signal	20-Pin Header Position
PA0	AD0	8
PA1	AD1	6
PA2	AD2	4
PA3	AD3	2
PA4	CLK	10
PA5	$\overline{CS}$	12
PA6	$\overline{RW}$	14
OSC1	Ground (Direct connection)	—
OSC3	Ground (Direct connection)	—
VDD	VDD	18
$\overline{RES}$	VPP	20
VSS	Ground (Direct connection)	11, 13, 15, 16, 17, 19

Programming Signal/2-Chip-1-Package Device Pin-out Cross-reference Table

Programming a 2-Chip-1-Package Device with the HT-MWriter

Prepare the OTP & MEM File Before Programming the 2-Chip-1-Package Device

Before the 2-Chip-1-Package device can be programmed, an OTP data file, with the file extension .OTP, must first be generated using the Build command of project menu under the HT-IDE3000 development environment. An optional data file, with the file extension .MEM, may be generated under HT-IDE3000 for data initialization. After finishing the build procedure, the HT-2CWriter hardware and the HT-MWriter software can then be used to program the 2-Chip-1-Package device.

Running the HT-MWriter Software Utility

After running the HT-MWriter software utility from under the Holtek HT-MWriter item in the main Windows program group, the window as shown in Figure 8 will be displayed.

MCU Type and Driver Type for Programming

The MCU box indicates the present MCU type that is to be programmed. Either of the following commands determines the MCU type:

- Open an OTP file by selecting the Open button, the OTP file contains MCU type of 2-Chip-1-Package device that is to be programmed
- Set the MCU type by selecting the MCU command in the Settings menu

Note If a 2-Chip-1-Package device blank check is required, then it is not necessary to open an OTP file. After the HT-2CWriter is connected to the PC, the HT-2CWriter software utility will reads the driver type from the HT-2CWriter and displays it in the Driver box as shown in Figure 8. If no driver type is read out, the HT-MWriter software utility will download the corresponding driver data to the writer according to the last MCU type or default MCU type. Therefore, the MCU type and the Driver type should be the same unless the connection between the PC and the HT-2CWriter is broken or the HT-2CWriter is powered off. The functions that can be executed by the HT-2CWriter depend upon the driver type in its flash memory. An incorrect driver type will induce programming errors. The user has to ensure that the MCU type and Driver type are the same.

On-Line Programming Mode

In Figure 8, the Program window contains/displays the program code read either from the OTP file or from a 2-Chip-1-Package device. The data window contains/displays the data read either from the MEM file or from the Data EEPROM of the 2-Chip-1-Package device. The Status Bar displays the result of executing a basic function.

Basic Functions

There are 9 function keys or control buttons as shown at the right hand side of the window shown in Figure 8, with each button representing an instruction, the functions of which are explained below.

→ **Open**

This opens two files with the same base file name, one has an .OTP suffix and the other has an .MEM suffix if it exists in the same folder as the OTP file. These are the contents of the memory which will be accessed when programming the relevant 2-Chip-1-Package device. After selecting "Open" the file dialogue box will be displayed from which the correct folder and file name can be chosen, as Figure 9. Only select the .OTP file, then .MEM file will be opened automatically by the HT-MWriter software program. The file contents of the .OTP file will be displayed in the Program window after being opened, the checksum of the opened file will be shown in Checksum box, and the contents of MEM file will be displayed in the Data window, as Figure 10. All zeros are displayed in the Data window if .MEM file does not exist in the same folder as that of .OTP file.

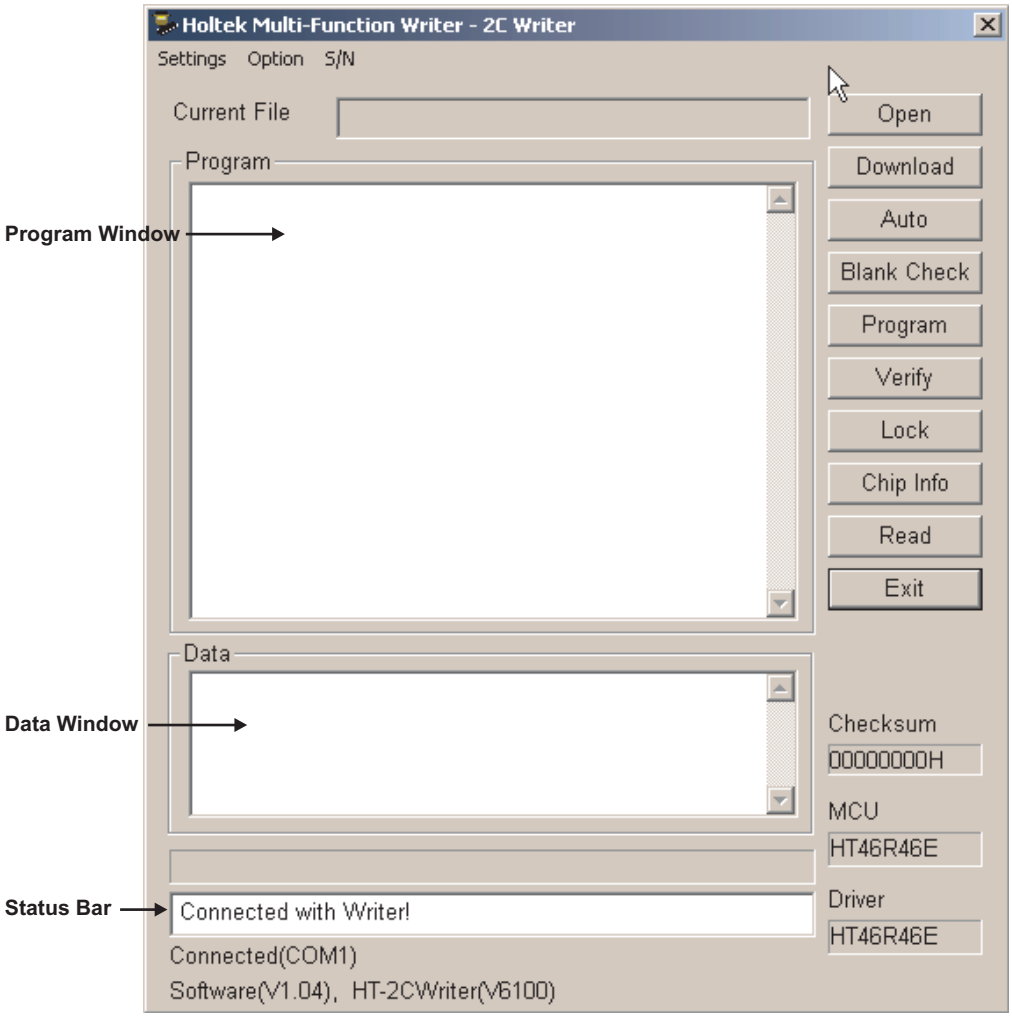


Figure 8

After opening an OTP/MEM file, the value in the Data window can be modified directly. Any modification is not written to the writer before executing the Download command.

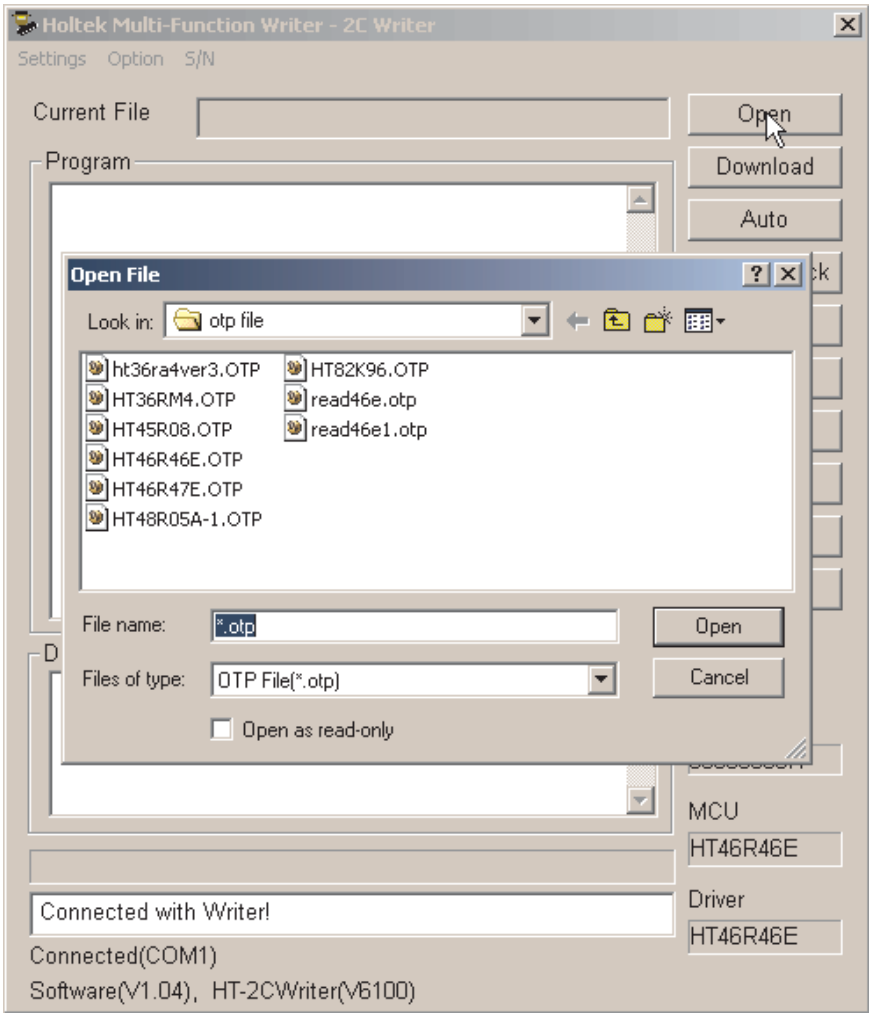


Figure 9

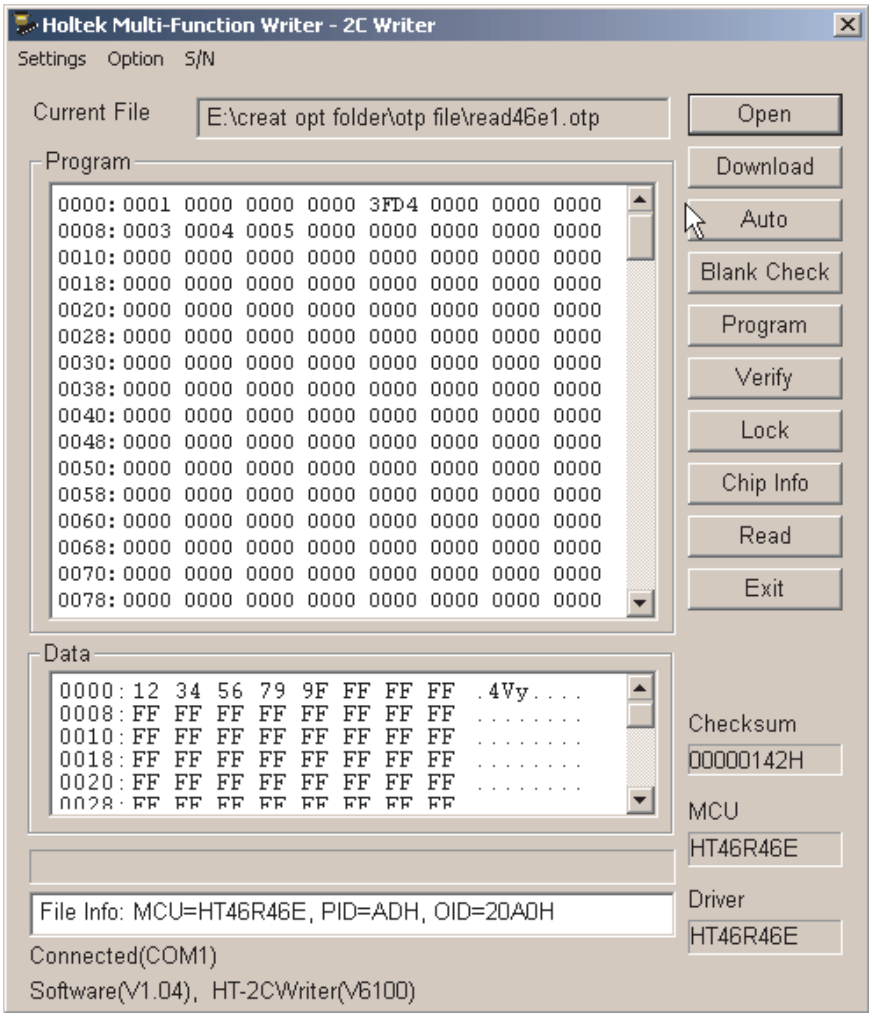


Figure 10

→ **Download**

This instruction downloads the contents of the presently opened OTP file, MEM file and driver information to the writer's flash memory, as Figure 11. There must have been an already opened OTP file and MEM file before using this instruction. User can edit or modify the initial value in the Data window before issuing this instruction.

→ **Blank Check**

This instruction checks that the presently loaded 2-Chip-1-Package device has not previously been written to. The results of this check will be displayed in the message window.

→ **Program**

This instruction encompasses two functions. The first is to program the data already in the writer's flash memory into the 2-Chip-1-Package device, the second is a verification check to ensure that the actual data burned into the 2-Chip-1-Package device is the same as the data in the writer's flash memory, as Figure 12. Before this instruction is used the relevant OTP file and MEM file must have been previously downloaded.

→ **Verify**

The contents of the presently loaded 2-Chip-1-Package device will be read and checked that it is the same as the data loaded into the writer's flash memory, the results of which will be displayed in the Program window. Before this instruction is used the relevant OTP file and MEM file must have been previously downloaded.

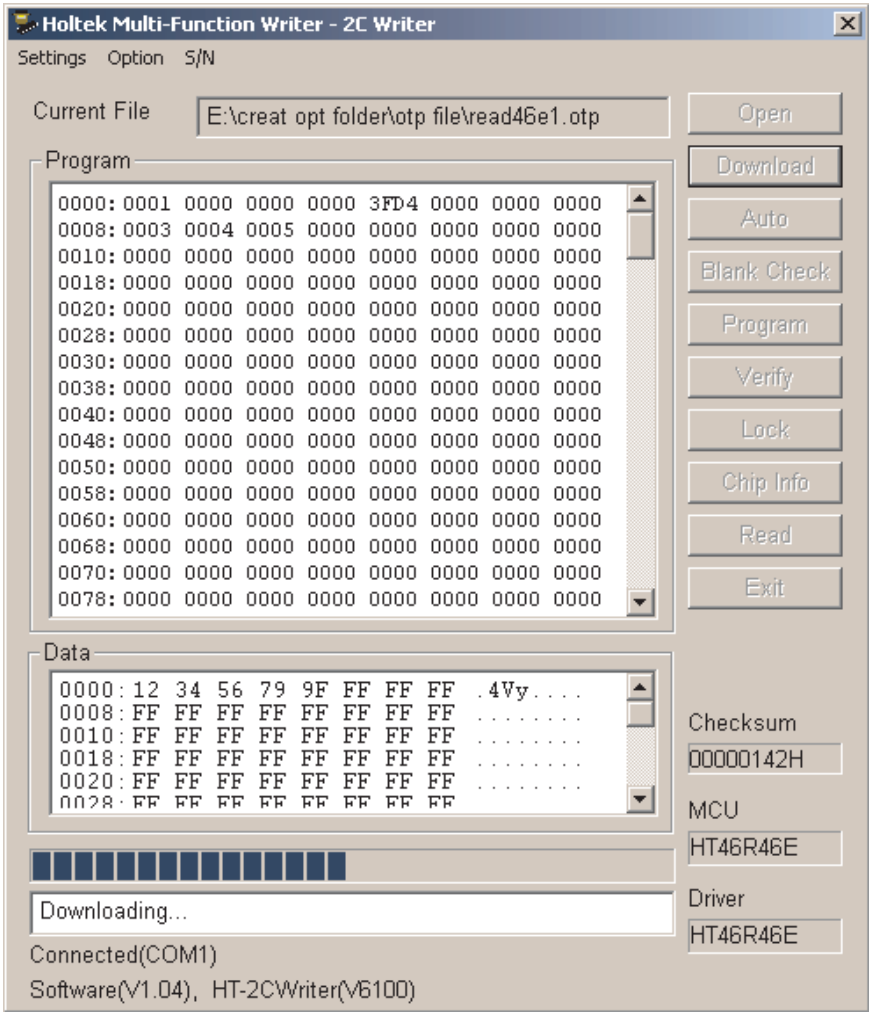


Figure 11

→ **Lock**

This instruction will implement a protect function in the 2-Chip-1-Package device preventing the contents of this 2-Chip-1-Package device from being read. After programming a 2-Chip-1-Package device, this instruction can be used to protect its contents.

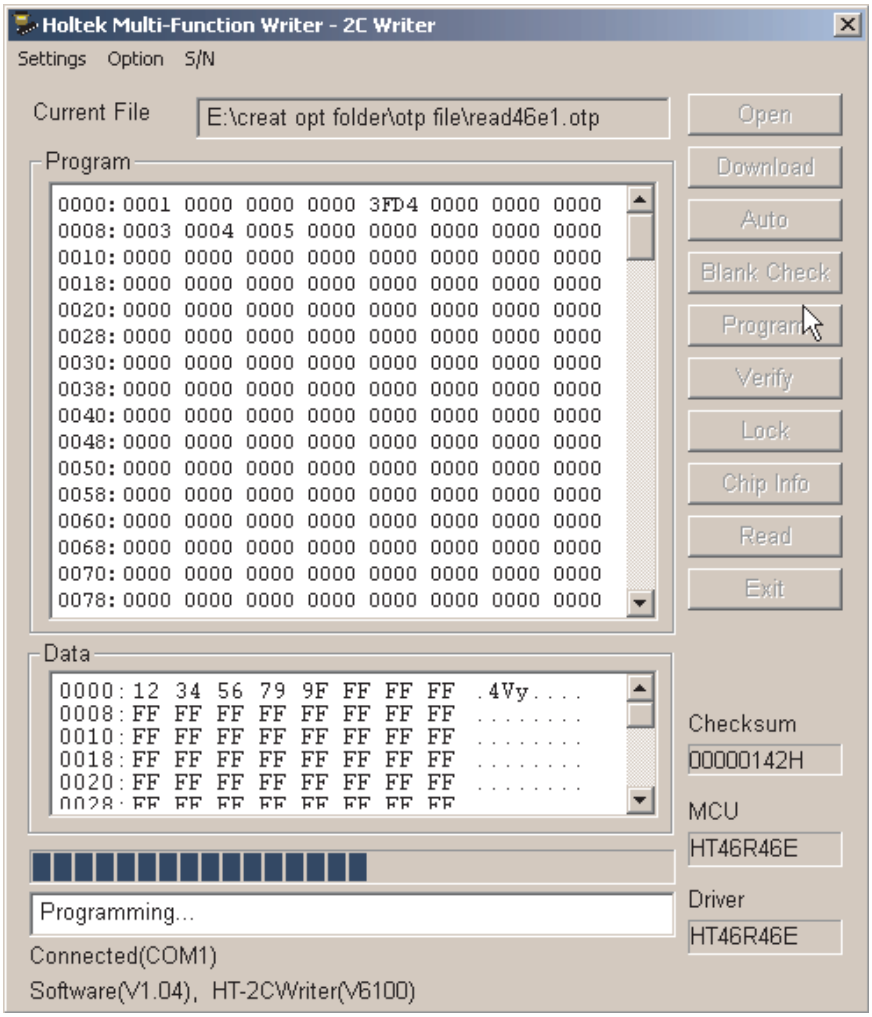


Figure 12

→ **Auto**

This instruction will execute up to four instructions consecutively: Blank Check, Program, Verify and Lock, as Figure 13. If any of the instructions do not execute correctly, the process will be halted with any following remaining instructions not being executed. The instructions to be executed by the "Auto" command can be selected from the Auto option under the Settings menu.

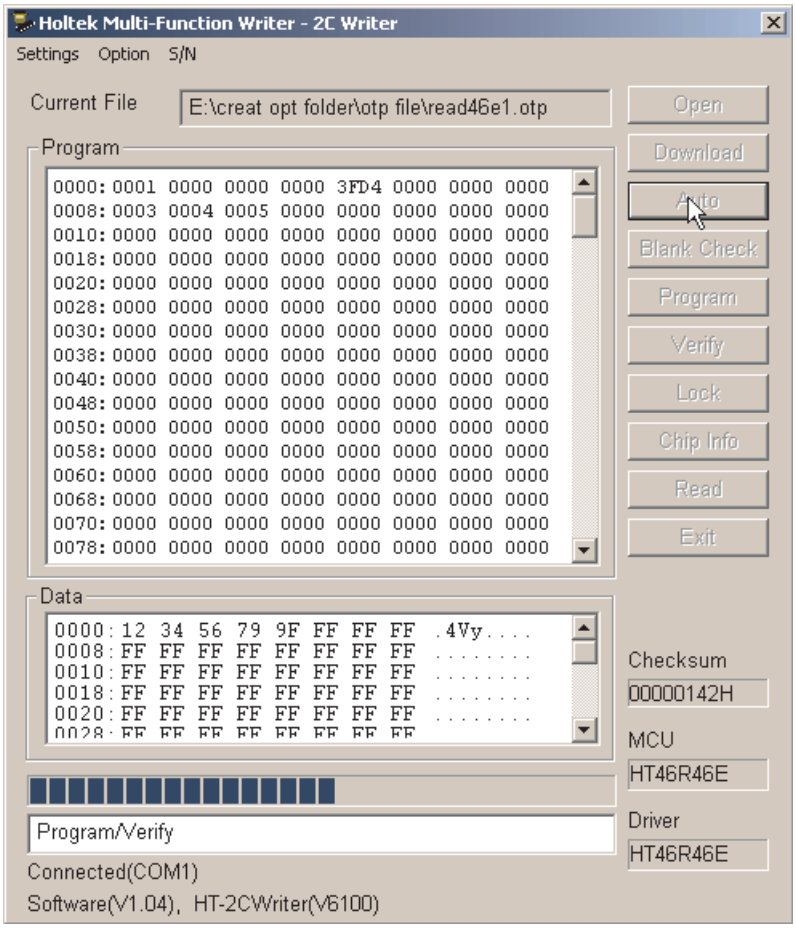


Figure 13

→ **Chip Info**

This instruction will read the power-on ID, the software IC, the ROM size and option size from the 2-Chip-1-Package device and display the results in the Program window as shown in Figure 14. If an 2-Chip-1-Package device does not contain this data or the HT-Mwriter software utility does not recognize the ID, then the message ″Failed to get chip info or the chip info is null″ will be displayed in the message window as shown in Figure 15.

→ **Read**

This instruction will read from the 2-Chip-1-Package device and display on the Program window and Data window as Figure 10. Then user can store it to a new OTP file and a MEM file individually. The content of writer's flash memory is not changed. If it is required to program a new 2-Chip-1-Package device from this read data, then the writer's flash memory should be updated by pressing Download key first, then press the Program key. This instruction will fail if the 2-Chip-1-Package device is locked already.

Figure 14

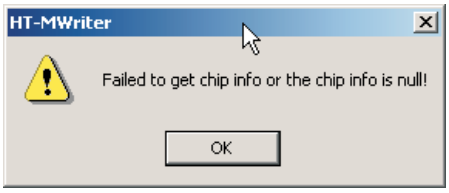
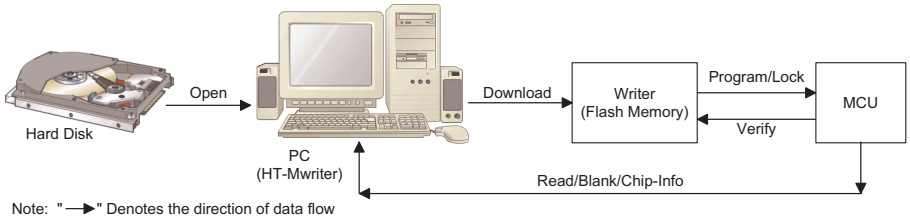


Figure 15

The relationship between function commands and programming resource.



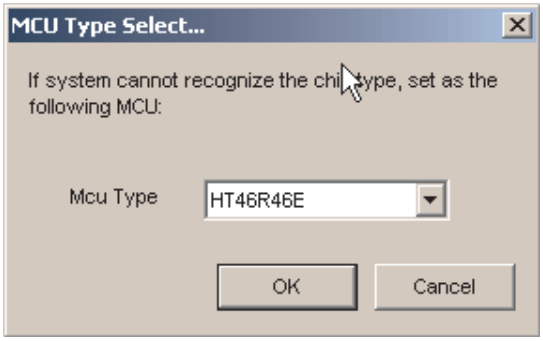
Additional Functions

→ **Setting**

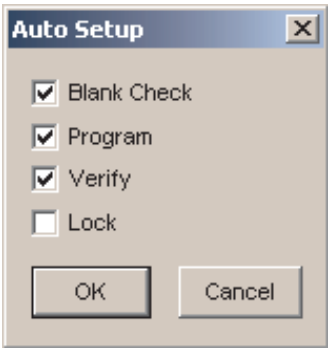
This menu contains four setup commands for the basic configuration of the HT-2CWriter which determines the way in which the HT-2CWriter is configured and operated. A detailed explanation of each command is shown below:

- Detect Connect
  This command will detect for a connection between the HT-2CWriter hardware and the PC and display the result in the Status Bar.

- MCU
  This command specifies a specific MCU type for following operations. The driver data for the specified MCU will be downloaded to the HT-2CWriter hardware if the writer has been connected to the PC and is powered on.



- Auto
  This command will setup which programming instructions are to be automatically and sequentially executed by the Auto button.



- Check ID
  Before executing any of the Blank Check, Program, Verify, Lock or Auto instructions, the writer can be setup to first check the 2-Chip-1-Package device type. This compares the 2-Chip-1-Package device type with the driver type in the writer's flash memory. If these two types are different, then the requested instructions will be aborted. The user can enable or disable this function.

→ **Option**

Two commands exist in this menu. The first of these is the option command which will display the configuration options for the presently opened 2-Chip-1-Package file as shown in the window in Figure 16. The other is the Print command, which will printout the configuration options for the presently opened OTP file.

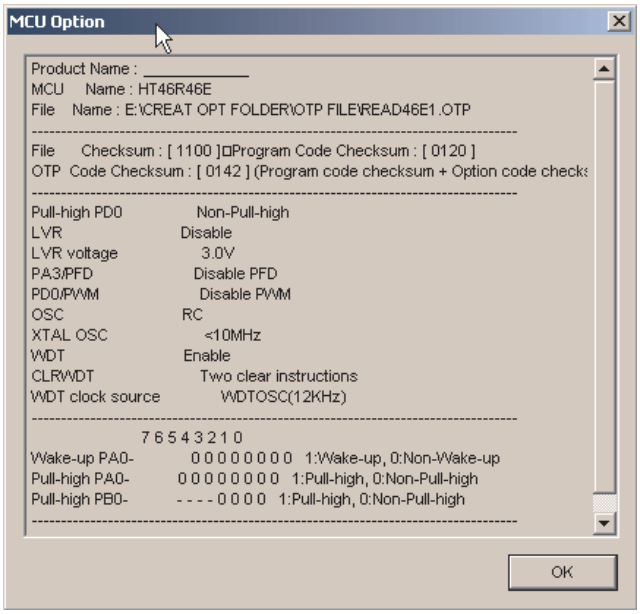

MCU Option
Product Name : _____
MCU Name : HT46R46E
File Name : E:\CREAT OPT FOLDER\OTP FILE\READ46E1.OTP
File Checksum : [1100]□Program Code Checksum : [0120]
OTP Code Checksum : [0142] (Program code checksum + Option code checks
Pull-high PD0 Non-Pull-high
LVR Disable
LVR voltage 3.0V
PA3/PFD Disable PFD
PD0/PWM Disable PWM
OSC RC
XTAL OSC <10MHz
WDT Enable
CLRWDT Two clear instructions
WDT clock source WDTOSC(12KHz)
7 6 5 4 3 2 1 0
Wake-up PA0- 0 0 0 0 0 0 0 0 1:Wake-up, 0:Non-Wake-up
Pull-high PA0- 0 0 0 0 0 0 0 0 1:Pull-high, 0:Non-Pull-high
Pull-high PB0- - - - - 0 0 0 0 1:Pull-high, 0:Non-Pull-high
OK

Figure 16

→ **S/N – Serial Number Writing**

The serial number function allows a user specified serial number to be written into each 2-Chip-1-Package device. This serial number, the address of which is specified by the user, is written into the Lower Byte address of Program ROM for each 2-Chip-1-Package device. After a serial number is written into an 2-Chip-1-Package device, an auto-incrementing function ensures that subsequently programmed devices will contain serial number incremented by one each time. It is first required to setup the initial data and fixed address of the first serial number. ″Selecting Setup″ from the ″S/N″ menu will display the window as shown in Figure 17, which can be used to input the initial serial number's data and its corresponding address.

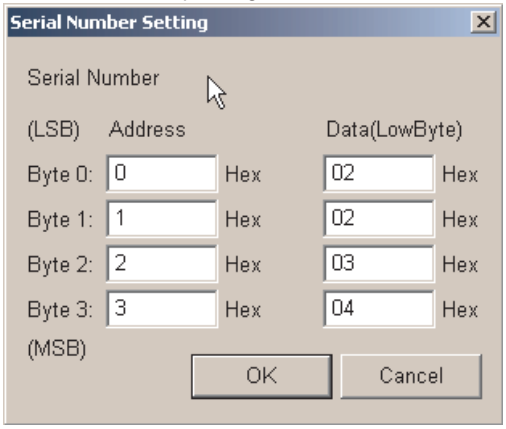


Figure 17

After the initial data and address information has been setup, selecting "Enable" from the "S/N" menu will activate the serial number function. When the serial number function is activated, the present serial number's corresponding address and data will be displayed at the lower right hand side of the main window as shown in Figure 18. During the programming stage the first device to be programmed will contain the previously setup serial number data in its Program ROM at the indicated address. Subsequent devices will contain serial numbers incremented by one for each additional device. To reset the order of serial numbers, again select "Setup" from the "S/N" menu.

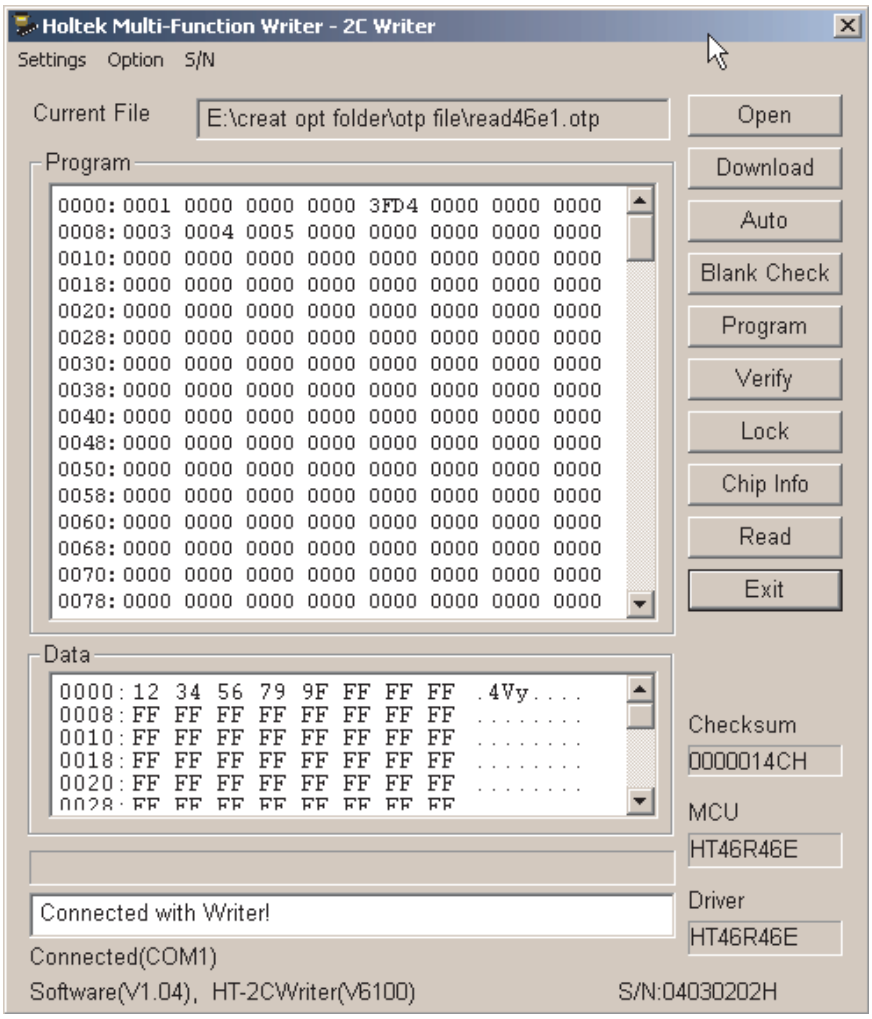


Figure 18

Stand-Alone Programming Mode

Before the stand-alone programming mode is used it is essential that the following steps have been first implemented:

- The program code must have been already been downloaded into the writer.
  When this happens the yellow LED will illuminate to indicate that the system is ready, if there is an error then the red LED will illuminate.
- Select the programming commands by adjusting the DIP Switch. The following table lists the DIP switch functions. Note that the DIP switches are only used for stand-along operation.

DIP Position	Function	Description
DIP1	Check ID	If DIP switch #1 is on, the writer will check if the ID type of the 2-Chip-1-Package device to be programmed has the same ID type as the program code which was downloaded to the writer
DIP2	Blank Check	If DIP switch #2 is on, the writer will run a blank check on the 2-Chip-1-Package to check if its contents are empty before programming. If DIP switch #2 is off, the writer will start programming without blank check.
DIP3	Lock	If DIP switch #3 is on, after programming the data into the 2-Chip-1-Package, the data will be locked and prevented from being read out in the future.
DIP4	Buzzer	If DIP switch #4 is on, then after programming, whether successful or not, an audible reminder signal will be generated.

Programming Steps

→ **Step 1**
Connect the supplied 16V power adapter, the writer will check whether the programming data in flash memory is correct or not. The system will be in a standby state if the programming data is valid. Otherwise, the writer must be connected to the PC using the supplied RS232 cable to download the program code to the writer.

→ **Step 2**
Place a 2-Chip-1-Package device that is compatible with the data in the writer, into the Textool socket.

→ **Step 3**
Press the programming switch to begin the programming cycle.

→ **Step 4**
Check the indicator LEDs to verify that the programming operation was successful.

→ **Step 5**
If successful, remove the programmed 2-Chip-1-Package device to allow the writer to return to its standby state. If the programming operation has failed, press the programming key again to allow the writer to go back to its standby state.

→ **Step 6**
Repeat step 2~step 5.

LED Indicator Description

The HT-2CWriter contains 3 LED indicators to display the status of the programming operation. The following table lists the meaning behind each of the LED indicators:

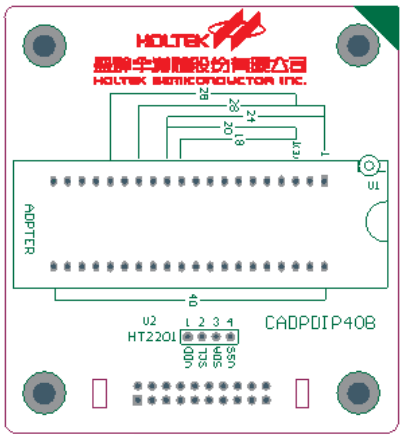
LED Type	Status	Description
Red LED – Failure Status	Flash once then stop	2-Chip-1-Package device is locked
	Flash twice then stop	Data in HT-2CWriter incompatible with present 2-Chip-1-Package device
	Flash 3-times then stop	2-Chip-1-Package device already contains data, device not blank
	Flash 4-times then stop	Programming failed
	Flash 5-times then stop	Programming complete but error detected during verification process
	Flash 6-times then stop	Fail to lock the present 2-Chip-1-Package device
	Rapid flashing*	Data in HT-2CWriter is invalid
Green LED – OK Status	LED illuminated	Programming successful
Yellow LED – Ready Status	Slow flashing	System is ready and awaiting programming instruction
	Rapid flashing	Programming operation in progress

* If the Red LED flashed rapidly, which indicates the content of the writer's flash memory is invalid. To repair this, just to connect the HT-2Cwriter to the PC and execute the HT-Mwriter software utility, then open an OTP file and download to the writer.

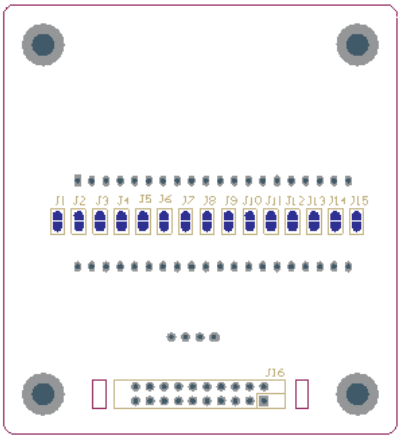
Using the Adapter Card

The HT-2CWriter is supplied with an adapter card which contains a 40-pin Textool socket. Before programming the 2-Chip-1-Package MCU device, be sure that the jumper selection on the rear of adapter card is correct. The front view, rear view and jumper selection of adapter cards are listed in the following.

→ **Adapter Card CADPDIP40B**



Front View

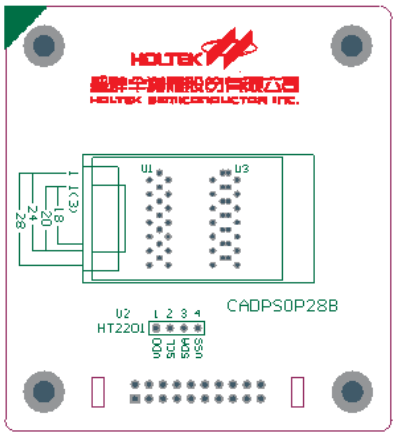


Rear View

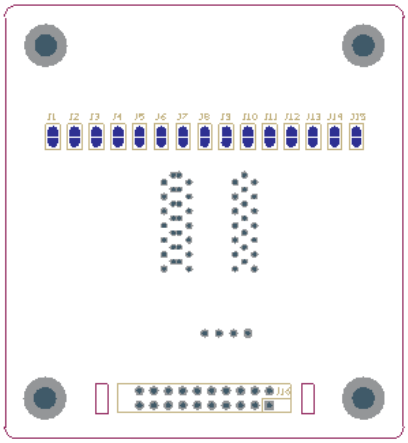
The following table lists the jumper selection, √ denotes the jumper must be shorted.

MCU Type	Package	Jumper for CADPDIP40B														
		J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15
HT46R46E	DIP18	√	—	—	√	—	√	—	—	—	—	√	—	√	—	—
HT46R47E																
HT45R04E		—	√	√	—	—	√	—	—	—	—	√	—	√	—	√

→ **Adapter Card CADPSOP28B**



Front View



Rear View

The following table lists the jumper selection, √ denotes the jumper must be shorted.

MCU Type	Package	Jumper for CADPSOP28B														
		J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15
HT46R46E	SOP18	√	—	—	√	—	√	—	—	—	—	√	—	√	—	—
HT46R47E																
HT45R04E		—	√	√	—	—	√	—	—	—	—	√	—	√	—	√

System Messages

→ **Download Driver OK!**
The PC has downloaded the MCU programming information to the writer's flash memory.

→ **Disconnected from the Writer**
The PC has failed to connect to the Writer, to rectify check the power supply and the RS232 cable.

→ **Connected with Writer!**
The PC has connected to the writer.

→ **Failed to Open File!**
The present OTP file cannot be opened, either this file has errors or the file format is invalid.

→ **Load File Failed!**
Can't load the present OTP file. Check the specified file.

→ **Not Support the Type of MCU!**
The software utility does not support the MCU type in the present OTP file or the driver in the writer.

→ **Not Support the of File!**
The software utility does not support the file format, it may not be the OTP file.

→ **Failed to Read OTP File Record!**
The file format of the present OTP file has errors or the file format is invalid.

→ **Failed to Allocate Memory!**
Failed to allocate memory for the present OTP file.

→ **Invalid Checksum for the OTP File!**
The checksum of the OTP file is incorrect.

→ **Writer is Busy.**
The writer cannot execute the requested command as it is still executing other operations.

→ **Failed to Write to Flash ROM!**
The writer is unable to download the contents of the OTP file or Driver data into the writer.

→ **Device is Locked!**
The 2-Chip-1-Package device has been locked.

→ **ID Error!**
The Driver is not consistent with the ID in the 2-Chip-1-Package device

→ **Not Blank!**
The 2-Chip-1-Package device is not empty.

→ **Programming Failed!**
Failed to program the 2-Chip-1-Package device.

→ **Verify Failed!**
The contents of the present 2-Chip-1-Package device is not consistent with the data in the writer's flash memory.

→ **Lock Failed!**
Cannot lock the present 2-Chip-1-Package device.

→ **ROM Format Error!**
The record format in writer's flash memory is incorrect. This error may be caused by incomplete downloading or because the contents of the flash memory is not valid for the present Driver in the writer.

→ **Writer Time-out!**
The writer does not respond after a command has been issued.

→ **Checksum of Received Data Error!**
The checksum returned from the writer is incorrect. Restart the writer and the software utility.

→ **Unknown Error!**
The software utility cannot recognize the message returned from the writer. Restart the writer and software utility.

→ **Not Blank!**
The result message for the Blank Check instruction indicating that the 2-Chip-1-Package device is not empty.

→ **Failed to Write to Program ROM!**
The writer has failed to write to the program ROM.

→ **Write OK!**
The writer has successfully programmed the program ROM.

→ **Verify Data Failed!**
The writer has failed to verify the contents of the data EEPROM.

→ **Verify OK!**
The writer has successfully verified the program ROM.

→ **S/N Address Exceeds the Program ROM Size, Set to Default Address: 1, 2, 3, 7**
The address specified for the serial number exceeds the program memory's range. The system will set the addresses to the default addresses 1,2, 3,7.

→ **S/N Addresses are not Blank in the OTP File!**
In the present OTP file, there is data already written to the address specified for the serial number.

→ **No Status Return from Writer**
The PC can not receive the return status from the writer. To rectify check the power supply and the RS232 cable.

→ **Unknown Status**
This is an internal error.

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